

- Pedestrian detector locations
- Signal standard types and locations
- Vehicle signal displays
- Pedestrian signal displays
- Phase diagram including pedestrian movements
- Emergency vehicle preemption requirements
- Illumination treatment

Submit a copy of the preliminary signal plan to the State Traffic Engineer for review and comment. When the proposed traffic signal is on an NHS highway, also submit a copy of the preliminary signal plan to the Assistant State Design Engineer for review and concurrence. After addressing review comments, finalize the plan and preserve as noted in the documentation section of this chapter. Prepare the contract plans in accordance with the *Plans Preparation Manual*.

If HQ is preparing the contract plans, specifications, and estimates for the project, submit the above preliminary signal plan with the following additional items:

- Contact person.
- Charge numbers.
- Critical project schedule dates.
- Existing utilities, both underground and overhead.
- Existing intersection layout, if different from the proposed intersection.
- Turning movement traffic counts; peak hour for isolated intersections; and AM, Midday, and PM peak hour counts if there is another intersection within 500 ft.
- Speed study indicating 90th and 10th percentile speeds for all approaches.
- Electrical service location, source of power, and utility company connection requirements.

After the plans, specifications, and estimate are prepared, the entire package is transmitted to the region for incorporation into their contract documents.

(11) **Electrical Design**

(a) **Circuitry Layout.** Consider cost, flexibility, construction requirements, and ease of maintenance when laying out the electrical circuits for the traffic signal system. Minimize roadway crossings whenever possible.

(b) **Junction Boxes.** Provide junction boxes at each end of a roadway crossing, where the conduit changes size, where detection circuit splices are required, and at locations where the sum of the bends for the conduit run equals or exceeds 360°. Signal standard or strain pole bases are not used as junction boxes. In general, locate junction boxes out of paved areas and sidewalks. Placing the junction boxes within the traveled way is rarely an effective solution and will present long-term maintenance problems. If there is no way to avoid locating the junction box in the traveled way, use traffic-bearing boxes. Avoid placing junction boxes in areas of poor drainage. In areas where vandalism can be a problem, consider junction boxes with locking lids. The maximum conduit capacities for various types of junction boxes are shown in the Standard Plans.

(c) **Conduit.** Use galvanized steel conduit for all underground raceways for the traffic signal installation on state highways. Thick-walled polyvinyl chloride (Schedule 80 PVC) conduit is used by many local agencies for ease of installation. At existing intersections, where roadway reconstruction is not proposed, place these conduits beyond the paved shoulder or behind existing sidewalks to reduce installation costs. With the exception of the 1/2 inch conduit for the service grounding electrode conductor, the minimum size conduit is 1 inch. The minimum size conduit for installations under a roadway is 1¹/₄ inch. Size all conduits to provide 26% maximum conductor fill for new signal installations. A 40% fill area can be used when installing conductors in existing conduits. See Figure 850-16 for conduit and signal conductor sizes.

(d) **Electrical Service and other components.** Electrical service types, overcurrent protection, and other components are covered in Chapter 840.

850.07 Documentation

A list of documents that are to be preserved
[in the Design Documentation Package (DDP) or
the Project File (PF)] is on the following website:
<http://www.wsdot.wa.gov/eesc/design/projectdev/>